



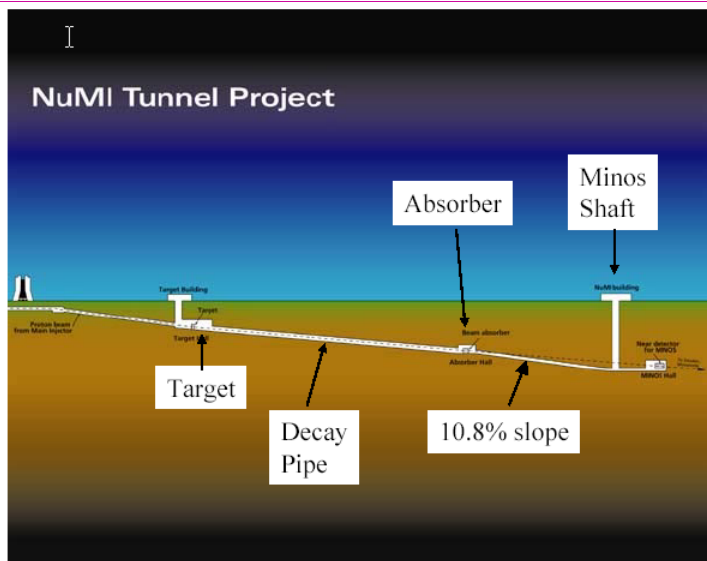
MINOS

Downstream Installation

- 1) MINOS Detector (C. James talk)
- 2) Hadron Monitor & Muon Monitors (briefly this talk)
- 3) Downstream Decay Pipe End Cap and Piping Connections (briefly this talk)
- 4) Hadron Absorber and Labyrinth (focus of this talk):
 - 1) Scope of items to be installed
 - 2) Status of design and fabrication
 - 3) Installation Plans and Schedule



Tunnel Environment



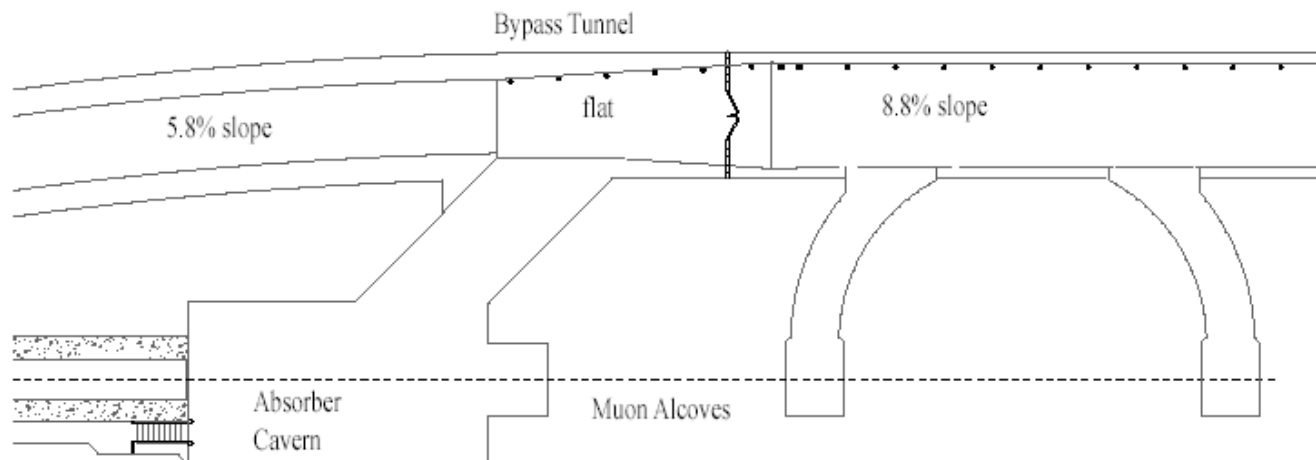
- 743' surface elevation
- 405' bottom of shaft
- 464.71' Absorber Cavern

- Station 37+61 at shaft
- Station 31+00 at labyrinth exit

Bottom 411' of length has slope of 10.8%

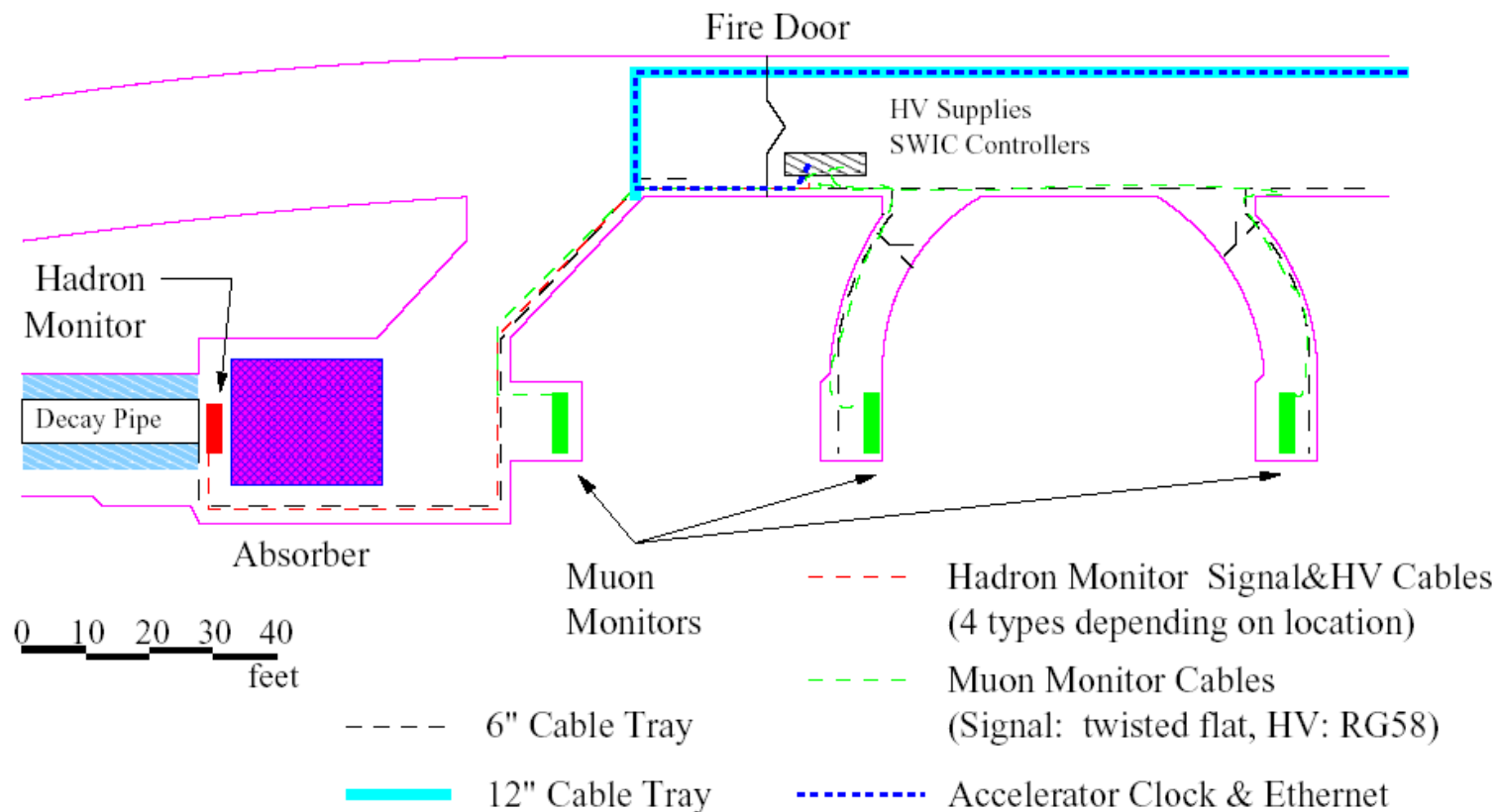
Upper 160' has a slope of 8.8%

Fire Doors at either end of sloped region, width 8'4", height 10'4"





Hadron & Muon Monitors





Installation Items for Minos Shaft

Director's Review of
NuMI Installation Planning
April 8 & 9 2003
Absorber Focus--Alan
Wehmann
Page 4

- Decay Pipe End Cap & 6" dia. connecting pipe
- Vacuum Pump Skid & Controls
- Concrete block shielding around decay pipe end (to absorber)
- Absorber (core, secondary containment system, surrounding shielding, RAW piping)
- RAW pump skid, controls, de-ionizer bottles
- Access Labyrinth



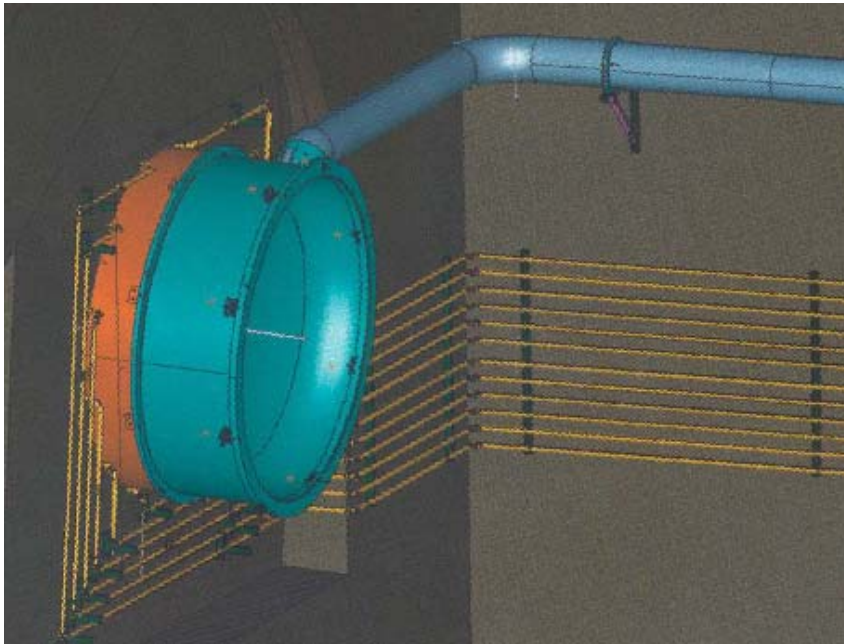
Installation Items for Minos Shaft (con't)

Director's Review of
NuMI Installation Planning
April 8 & 9 2003
Absorber Focus--Alan
Wehmann
Page 5

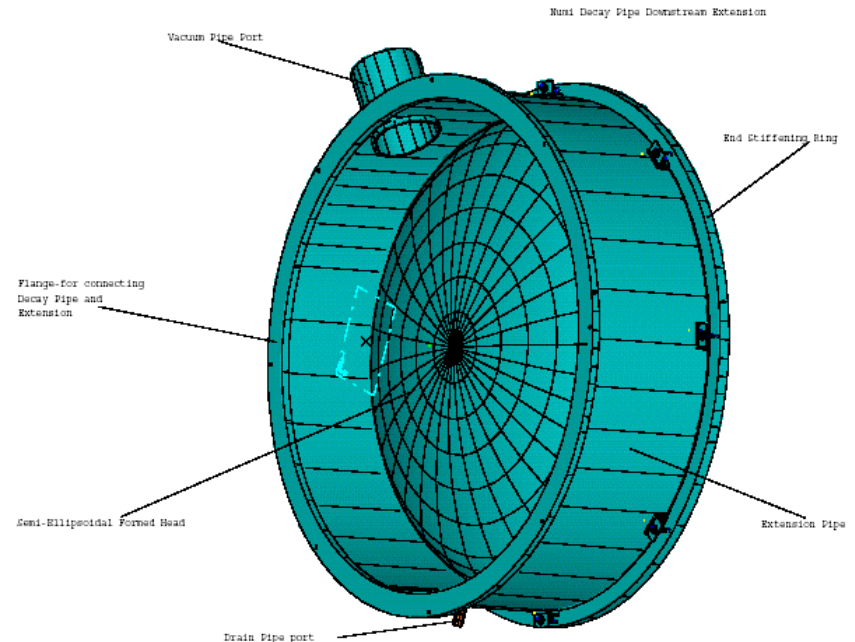
- DS Hadron monitor (downstream of decay pipe, inserted into shielding via slot)
- Muon monitor stations (one in cavern, two in separate alcoves)
- Near Detector
 - « Spectrometer planes
 - « Calorimeter planes
 - « Magnet coil
 - « LCW skid



DS Decay Pipe Endcap



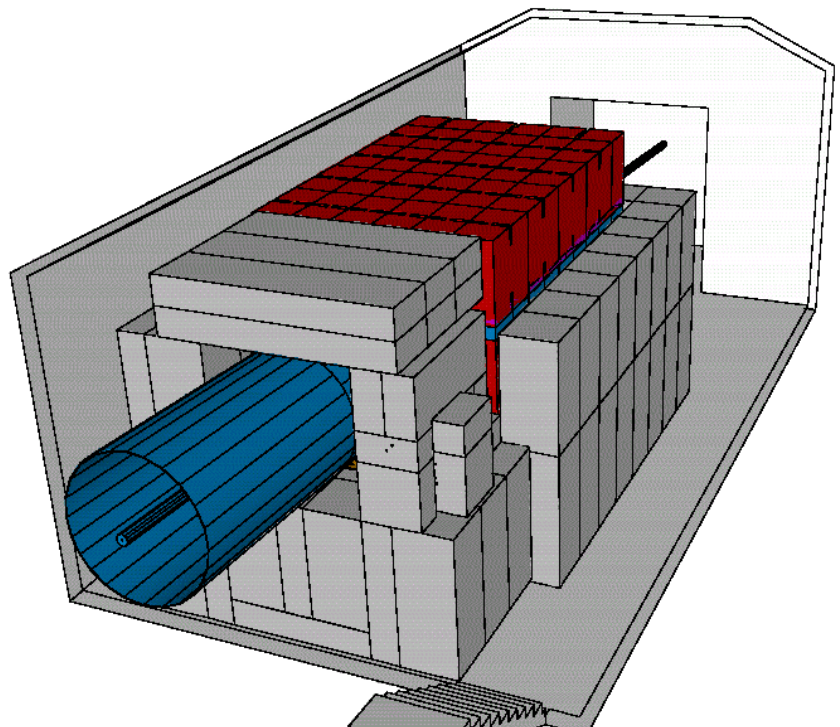
Endcap is shown welded in place, cooling pipes are in SB&O contract



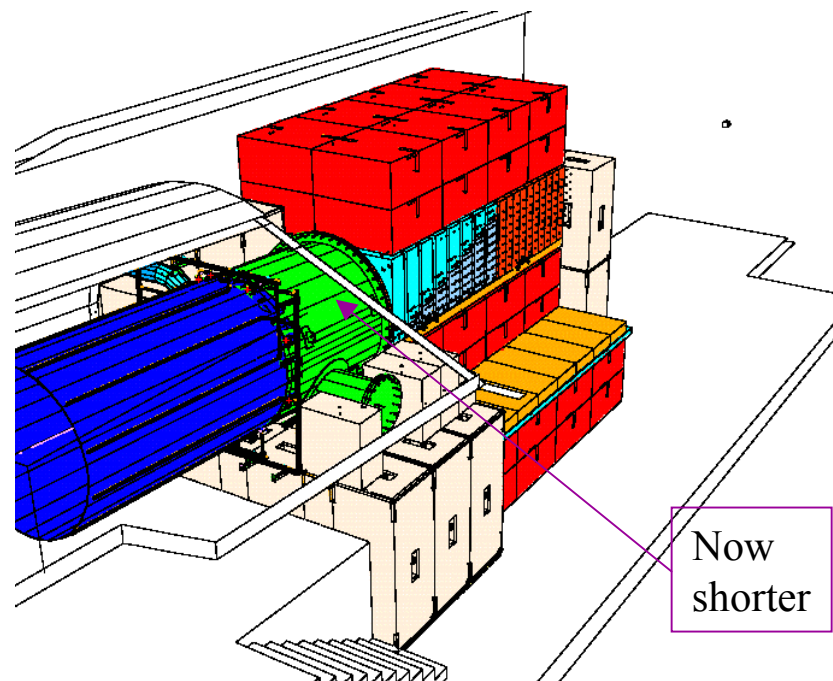
Material is carbon steel, “window” thickness is $\frac{1}{4}$ ". Fabrication is complete.



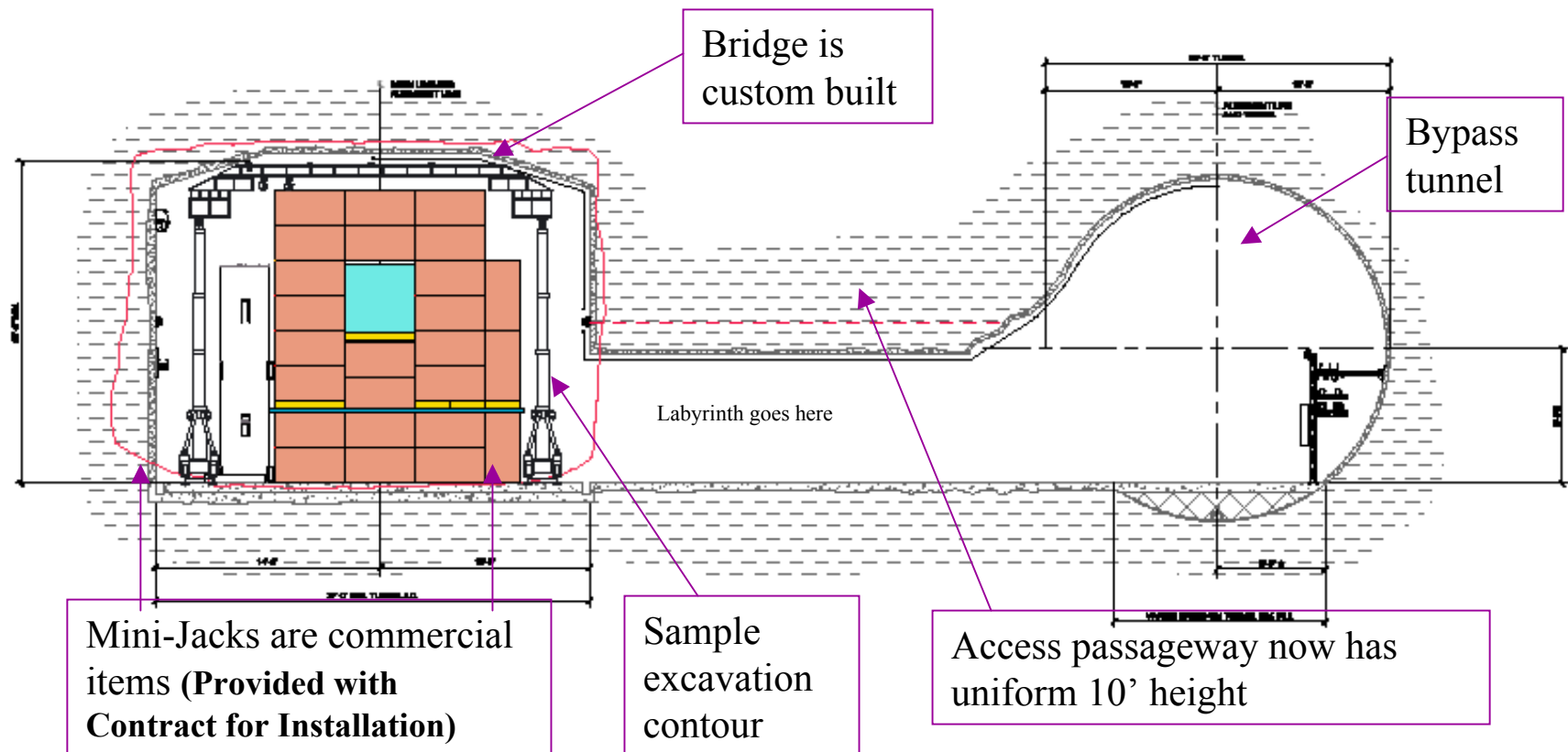
Views in Absorber Cavern



US blockhouse surrounds end of decay pipe and DS Hadron monitor, picture somewhat out of date



Cut-away showing absorber core.
Thermocouples will monitor
temperature at max E dep in aluminum
& just upstream of first steel piece



Drawing package for Mini-Jack crane exists



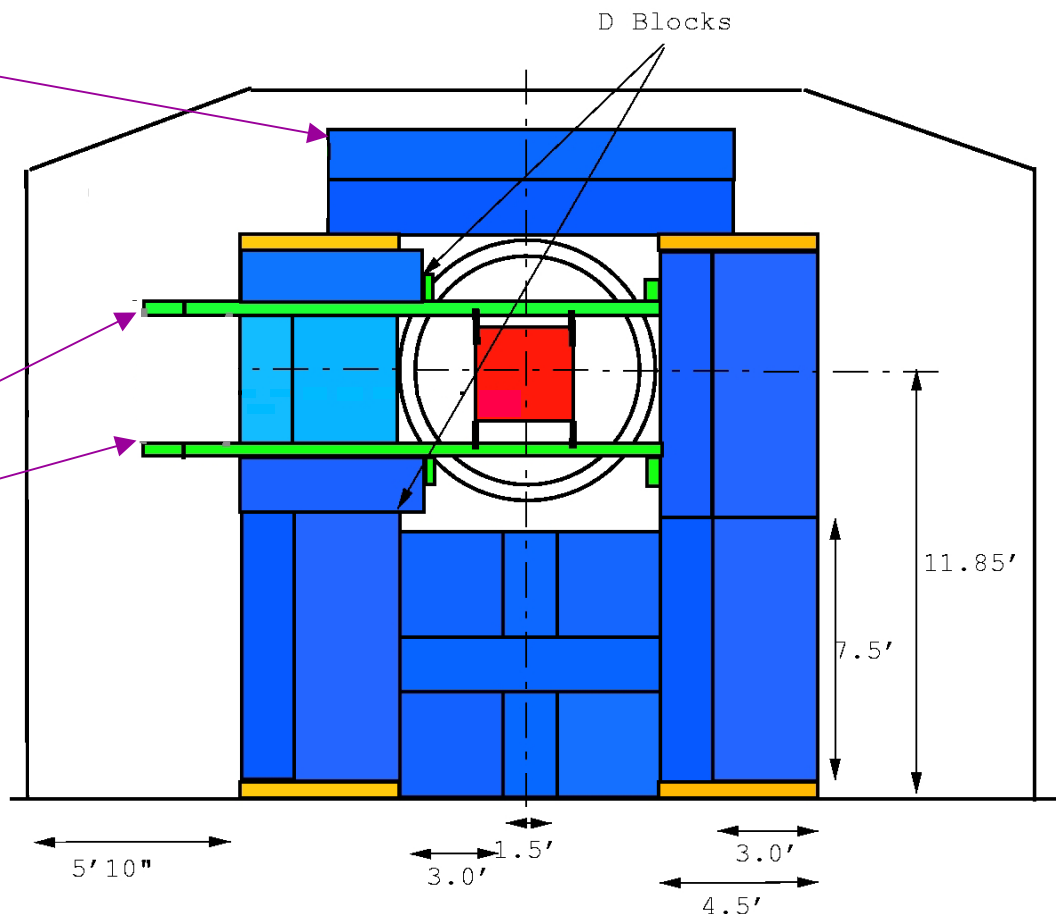
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Cross Section View at DS Hadron Monitor

Director's Review of
NuMI Installation Planning
April 8 & 9 2003
Absorber Focus--Alan
Wehmann
Page 9

Top "J" blocks can't be handled by Mini-Jack crane (unless it is raised)

Slot in shield and mounting rails for DS Hadron Monitor

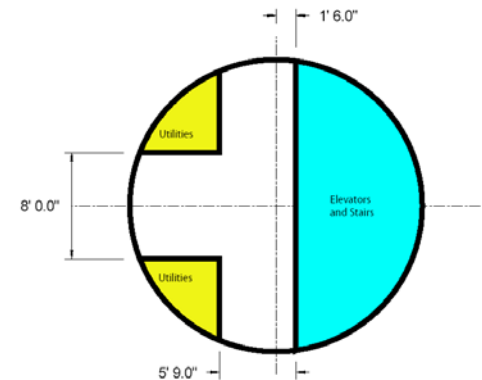
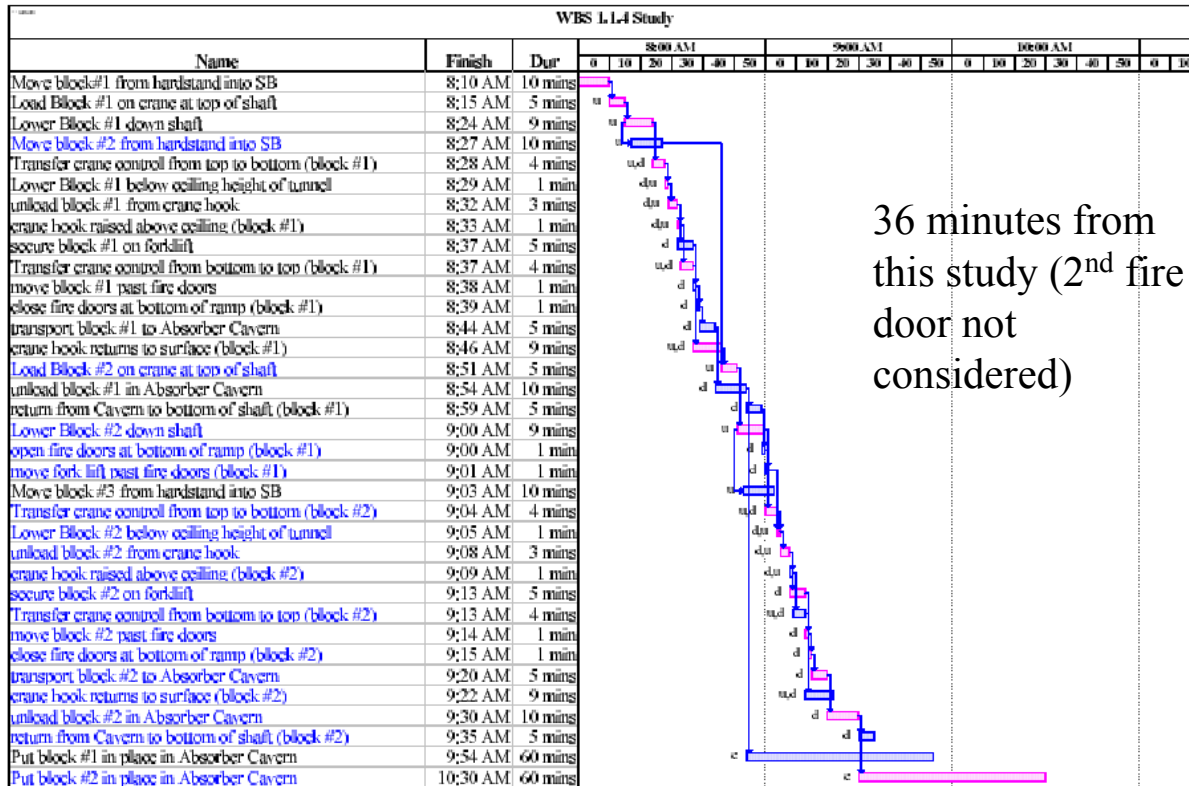




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Time Study, 2 blocks

Director's Review of
NuMI Installation Planning
April 8 & 9 2003
Absorber Focus--Alan
Wehmann
Page 10



100 pieces of steel
in absorber
shielding + 10
behind 8 water-
cooled Al modules

>54 concrete blocks in
absorber & upstream
(not counting 35 in
labyrinth)

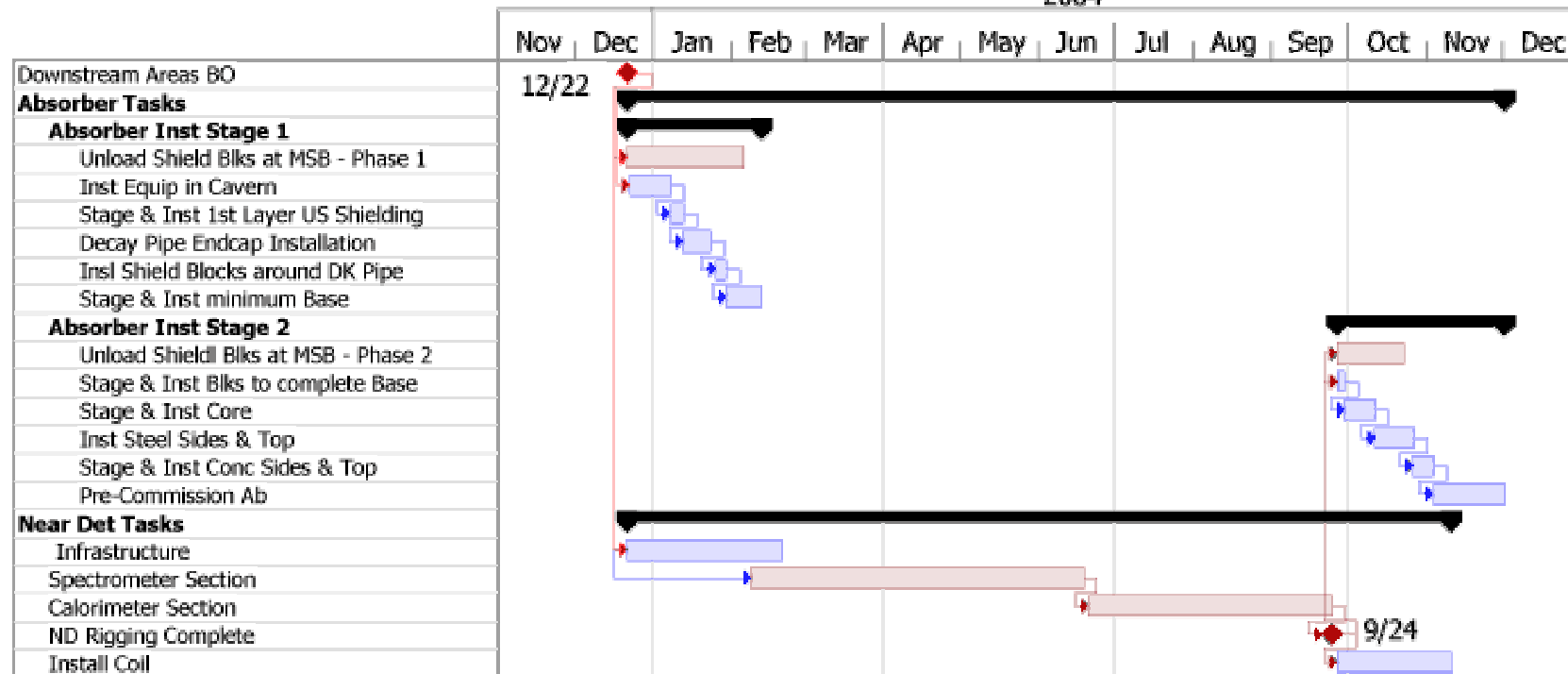
Allowance of 45 minutes to stage per block, 60 minutes to position
(hydraulic crane slow, can't pick off floor, etc.)



Installation Schedule

(Absorber and MINOS)

2004





Absorber Materials on hand

- 100 Duratek blocks (52" x 52" x 26") are at the railhead
- 8 Al core modules (51" x 51" x 12"): four delivered, four to come in ~ 1 week (saw-cut). Need to gun drill cooling passages in these.
- 10 Fe core modules (51" x 51" x 9.1"): CCS steel being flame cut at railhead, clearance holes for RAW pipes to be drilled at MAB



Additional Absorber Material

- 32 "B" concrete shield blocks (7.5'x3'x3'), from inventory
- 10 "A" concrete shield blocks (7.5'x3'x1.5'), from inventory
- 4 "C", 2 "D", 4 "J" concrete blocks, from inventory
- 4"x6"x54" lg. Flats, H.R. steel, buy 6
- 3"x6"x27" LG. Flats, H.R. 1018 steel, buy 18
- 3"x26"x52"-A36 steel, buy 16
- 1"x26"x156" LG. Plate-A36 steel, buy 8
- RAW piping & manifolds, not yet ordered
- Four thermocouples, cable, not yet ordered (NYO)

Sheet metal,
storage tank,
piping for 2ndary
containment, not
yet ordered

Mix of concrete shield blocks will change, once design is changed to incorporate a 6" wide slot for the DS Hadron Absorber



Status Update

- The decay pipe end caps have been fabricated (for both ends). The decay pipe Engineering Note has been modified, due to a reduction in diameter of the connecting pipe from 10" to 6". No problems with its review are anticipated.
- Four saw-cut pieces of aluminum (51" x 51" x 12") for the absorber core Al modules have arrived at the lab; the remaining four should arrive shortly.
- The absorber core engineering redesign is finished (removed 3" air gaps between cooled aluminum modules--to reduce air activation). Drawing corrections for the core drawing package are in progress (~1 week). The bid package for gun-drilling the cooling holes will be prepared once these drawing corrections are done.
- The CCS steel for the back end of the core is being flame cut at the railhead. The 1.5" diameter clearance holes for the 32, 1" diameter RAW pipes have to be drilled, in the 10 pieces that result (likely to be drilled at MAB).



Status Update cont.

- Assembly drawings for the absorber shielding and cavern layout are in progress. The shielding reconfiguration for the 6" slot for the DS Hadron Monitor needs to be incorporated. The four connecting manifolds for the 32 RAW pipes need to be designed.
- Work on the installation specification is in progress.
- To limit air activation, an air containment box is planned for the region between the DS Hadron monitor and the start of the absorber core (not yet designed). A Herculite sealing wrap around the absorber shielding is also planned (to be done by Fermilab technicians).
- Labyrinth layout drawings exist. Recent survey results for the cavern and access are being analyzed for their implications on the labyrinth dimensions and positioning.



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Conclusions

- Need to assign an engineer for completing the Installation Specification and arranging for commencement of work (FP or T&M)
- Get a Floor Manager assigned and work with both tasks (Absorber and MINOS) to facilitate the shaft activity